1. (previously presented) A time domain head-related transfer function model for use with 3D sound applications, comprising:

a plurality of Eigen filters;

a plurality of spatial characteristic functions derived from time domain head-related transfer functions and adaptively combined with said plurality of Eigen filters; and

a plurality of regularizing models adapted to regularize said plurality of spatial characteristic functions prior to said respective combination with said plurality of Eigen filters.

2. (previously presented) The time domain head-related transfer function model for use with 3D sound applications according to claim 1, further comprising:

a summer operably coupled to said plurality of combined Eigen filters combined with said plurality of regularized spatial characteristic functions to provide said time domain head-related transfer function model.

3. (previously presented) The time domain head-related transfer function model for use with 3D sound applications according to claim 1, wherein:

said plurality of regularizing models are each adapted to perform a generalized spline model.

4. (previously presented) The time domain head-related transfer function model for use with 3D sound applications according to claim 1, further comprising:

a smoothness control operably coupled with said plurality of regularizing models to allow control of a trade-off between localization and smoothness of said time domain head-related transfer function.

5. (previously presented) A time domain head-related impulse response model for use with 3D sound applications, comprising:

a plurality of Eigen filters;

a plurality of spatial characteristic functions derived from head-related impulse responses and adapted to be respectively combined with said plurality of Eigen filters; and

a plurality of regularizing models adapted to regularize said plurality of spatial characteristic functions prior to said respective combination with said plurality of Eigen filters.

6. (previously presented) The time domain head-related impulse response model for use with 3D sound applications according to claim 5, further comprising:

a summer adapted to sum said plurality of combined Eigen filters combined with said plurality of regularized spatial characteristic functions to provide said head-related impulse response model.

7. (previously presented) The time domain head-related impulse response model for use with 3D sound applications according to claim 5, wherein:

said plurality of regularizing models are each adapted to perform a generalized spline model.

8. (previously presented) The time domain head-related transfer function model for use with 3D sound applications according to claim 5, further comprising:

a smoothness control in communication with said plurality of regularizing models to allow control of a trade-off between localization and smoothness of said time domain head-related transfer function.

9.   (previously presented)   A method of determining spatial characteristic sets for use in a time domain head-related transfer function model, comprising:

constructing a covariance data matrix of a plurality of measured time domain head-related transfer functions;

performing an Eigen decomposition of said covariance data matrix to provide a plurality of Eigen vectors;

determining at least one principal Eigen vector from said plurality of Eigen vectors; and

projecting said measured time domain head-related transfer functions back to said at least one principal Eigen vector to create said spatial characteristic sets.

10.   (previously presented)   A method of determining spatial characteristic sets for use in a time domain head-related impulse response model, comprising:

constructing a time domain covariance data matrix of a plurality of measured head-related impulse responses;

performing an Eigen decomposition of said time domain covariance data matrix to provide a plurality of Eigen vectors;

determining at least one principal Eigen vector from said plurality of Eigen vectors; and

back-projecting said measured head-related impulse responses to said at least one principal Eigen vector to create said spatial characteristic sets.

11.   (previously presented)   Apparatus for determining spatial characteristic sets for use in a time domain head-related transfer function model, comprising:

means for constructing a covariance data matrix of a plurality of measured time domain head-related transfer functions;

means for performing an Eigen decomposition of said covariance data matrix to provide a plurality of Eigen vectors;

means for determining at least one principal Eigen vector from said plurality of Eigen vectors; and

means for back-projecting said measured time domain head-related transfer functions to said at least one principal Eigen vector to create said spatial characteristic sets.

12.   (previously presented)   Apparatus for determining spatial characteristic sets for use in a time domain head-related impulse response model, comprising:

means for constructing a time domain covariance data matrix of a plurality of measured head-related impulse responses;

means for performing an Eigen decomposition of said time domain covariance data matrix to provide a plurality of Eigen vectors;

means for determining at least one principal Eigen vector from said plurality of Eigen vectors; and

means for back-projecting said measured head-related impulse responses to said at least one principal Eigen vector to create said spatial characteristic sets.